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Abstract

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Keywords: Environmental Degradation, Pakistan, Political Ecology, Sustainability, Deforestation

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Title

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Abstract

The degradation of the environment in Pakistan has become worse through historical, socio-economic, and geopolitical interactions. This narrative review considers burning issues like deforestation, water shortage, and soil and water pollution, which can be linked to colonialism, industrial change, and urbanization. The review is an analysis that takes into consideration the political ecology approach, which demonstrates how political power has led to resource capture and environmental unfairness. This approach enhances the aspect of sustainability, stating measures be drawn from other nations to avoid further harm to ecology. While policy compliance is weak, promoting industrial development has brought negative impacts, according to the review of policy solutions such as afforestation programs, integrated management, and sustainable policies. The recommendations include reinforcing and promoting environmental legislation, improving intersectoral cooperation, and finding sustainable development that would help strengthen Pakistan's ecological base.

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Introduction

The nature of the environment in Pakistan across the last few decades has seen alarming changes due to factors including deforestation, shortage of water, soil erosion, and pollution. As a developing country, Pakistan is experiencing increasing environmental issues that affect its natural resources and climate, the growth of its economy, and the health of its people. Suppressing these issues' history and development helps to prevent their arising and develop efficient solutions. This will be a historical narrative review designed to identify studies documenting trends and patterns of environmental degradation in Pakistan and to compare and contrast the collected research to characterize current knowledge gaps.

Hydro-environmental degradation in Pakistan has historical antecedents related to socio-economic and political factors. It continued and solely. For instance, colonial policies prioritized resources,

promoting short-term yield at the cost of long-term productivity that changed the arrangement of agriculture, forestry, and fishery, aiming at stable yield much at the cost of ecological balance (Hasan & Ali, 1992). The impacts of these policies hold on today, shaping the development path and environmental policies of the modern period.

Post-independence, Pakistan witnessed a surge in industrialization and economic development, which unfortunately led to a worsening of environmental issues. Sectors such as textiles and leather tanning have significantly contributed to emissions, with the resultant pollutants exerting immense pressure on natural resources (Warner, 2023). This industrial growth, while pivotal for economic progress, has come at the cost of ecological balance, with air and water pollution and other forms of environmental degradation intensifying over time (Alam, 2010). The struggle between industrial progress and environmental preservation remains a critical issue in Pakistan.

Rapid urbanization in Pakistan has brought about significant environmental challenges. The growth of cities has led to issues such as soil erosion and CO_2 emissions, primarily due to uncontrolled urbanization and industrialization. The intertwining of urbanization and industrial development has resulted in cycles of environmental degradation that pose a threat to both rural and urban areas.

These are political factors that have also negatively influenced Pakistan's environment. This water power politics with neighboring India over the water of the Indus Basin has raised ecological issues and contributed to water insecurity, deforestation, scarcity, and other comparable problems (Ahmed & Mashkoor, 2016). Land use change, characterized often by deforestation due to industrial and urban progression, has further worsened climate change and elevated levels of CO_2 in the environment (Ali et al., 2014).

The two innovations of the Green Revolution and the advancement of Globalization exacerbated the effects of environmental decay within Pakistan. While these movements created economic development, they were indifferent to ecological concerns. This paper agrees with Alam (2010) that the advancement in technology in agriculture production and increased industrial growth has caused soil erosion, overuse of resources, and increased pollution.

Environmental problems in Pakistan are aggravated by poor policies and weak enforcement of environmental legal frameworks (Sohail et al., 2014; Faruqee, 1997). As evidenced in the previous sections, legal frameworks as instruments are in place, but there is no enforcement and monitoring of compliance, hence encouraging unsustainable practices. Developments such as subsidies and ill-defined property rights in goods and services put in place the economic policies that have led to "brown" and "green" environmental deficits like water logging and deforestation. The new emergence of late such as the China-Pakistan Economic Corridor brings new environmental problems coupled with new avenues of policy change (Butt et al., 2021; Faruqee, 1997).

There are prospects for the transition to sustainable development, even if, in the past, the key factors encouraging environmental degradation were prevalent. Population reviews reveal that other structural measures, such as afforestation and the incorporation of environmentally friendly policies, could improve environmental sustainability (Lin & Ullah, 2024). In addition, global lessons on lessons on the environment, especially recent Chinese reforms, are relevant for policy comparison for sustainable economic development in Pakistan.

Thus, this review intends to fill the gaps in existing literature by providing a topical and accessible history of the country as it relates to environmental degradation in Pakistan. Not only does it reveal the problems that can arise in the cases of uncontrolled industrial and urban growth, but it also shines a beacon of hope on the possibility of successful development that can come from the intelligent application of policy change and standard practices.

Literature Review

Remote sensing applications and GIS analysis have received considerable attention for documenting ecological deterioration in Pakistan due to deforestation, land-use change, and desertification. These tools have made the findings regarding forest cover and the state of the land due to anthropogenic activities in different regions of Pakistan possible.

Using satellite images of Ayubia National Park, Aftab et al. (2024) concluded that deforestation rapidly advances within the park due to human encroachment. It emerged that the park recorded a

decline in the forest cover within its ecosystem from 1992 to 2022. This observation corresponds well with other findings in Pakistan in which deforestation has been associated with legal and illegal logging activities, expansion of agriculture and yield, and population growth. Likewise, Raza et al. (2024) pointed to land cover change research done in Balochistan and Sindh provinces, where they found a vegetation loss of 68.50 km² in the year 2023 when compared to the year 2013 coupled with a 2.23 % increase in the settlement areas. This goes a long way to show the extent of human population growth's effects on natural resources, with the bonus of adding to the canker of land degradation and deforestation.

Specifically, researchers investigating the Murree of Pakistan have also established an acute decline in forest cover. Similarly, Hira et al. suggest that from 2000 to 2019, the pine forest in Murree had reduced from 45% to 35% due to the continued problems with forest conservation in Pakistan. Goheer et al. (2023) provided an opposite example in Khyber Pakhtunkhwa (KPK), where KPK has made extensive plantations, increasing the forest area by 32 percent between 1990 and 2020. This affirms the possibility of restoration of lost status through reforestation plans, although it brings to light the difference in the approaches to environmental management and the efficiency of the local conservation projects.

Besides, the issues of land degradation and desertification have also received a lot of focus going forward. Hissan et al. used satellite footage (2024) to analyze the desertification of different parts of Pakistan, which showed significant degrees of degradation, particularly in the cropping lands. These findings are daunting, as they indicate that climate change, together with unsustainable agriculture, is deepening the rate at which productive land is being eroded, hence posing an option for future food insecurity and income sources.

The impact is not only environmental but also social and economic ramifications. For instance, Shahzad, 2024, Muhammad et al., 2024, and Chishti et al., 2022) have analyzed the qualitative and quantification effects on the Agriculture, Fisheries, and Energy sectors. Shahzad (2024) pointed out that fish stock reduction is due to environmental pollution, which causes poverty to the people on the coast. In addition, there is much focus on the relationship between resource scarcity, poverty, greed, and unsustainable fishing practices. Chishti (2022) and Muhammad et al. (2024) reported that excessive dependence on non-renewable energy resources exposed Pakistan to severe environmental degradation and slow economic and health development. Renewable energy plays a crucial role in the context of sustainable development. However, more than contemporary policies are needed to meet these challenges.

Studies on Pakistan's environmental policies have also shown major flaws in the country's Environmental Impact Assessment (EIA). Khan and Chaudhry (2024) highlighted that the current EIA reports have major methodological issues, which include poor scoping and the absence of evaluation of diverse options. These shortcomings erode the fabric of environmental governance in Pakistan and, more essentially, the sustainability of development-related projects. In line with previous studies (e.g., Saif et al., 2015), there is also a lack of adequate stakeholder participation and clarity concerning the EIA practices, which increases these difficulties, implying the need for reform to improve environmental responsibility.

In as much as there was little progress in managing environmental pollution through technology and reforestation, there is still much to be desired when assessing the socioeconomic impacts and compliance with environmental policies. This is one of the major areas for improvement that require further probe, as other key challenges include poor policies aimed at tracking the state of forest health in the long run and poor incorporation of socioeconomic concerns into environmental management initiatives. Furthermore, the involvement of foreign funding further increased corruption and environmental problems, as Adnan et al. (2024) stated. To this, Pakistan's environmental governance framework enhances complexity.

Pollution of sea coasts and hilly areas of Pakistan is another major problem. The study recognizes that in rural areas, peasant producers need to catch up with nature management (Amalric & Banuri, 1995). The Kaghaan and Naran valleys are the most visited places, and the environmental impacts and symptoms, such as land degradation and forest conversion to settlements due to tourism consequences and changing climate, were identified using satellite imagery surveyed by Yasin et al., 2023.

Semi-arid mountainous pretext state resources are significant for marginal communities, especially women, in their exigent communal natural resources. However, these resources are eroding away, and potential livelihood sources for poor women-headed households are endangered (Tabassum, 2012). Causes for environmental deterioration in Pakistan include poverty, industrial development, utilization of fertilizers, and increased traffic and population. Even though the process of globalization has demonstrated its capacity to reduce levels of environmental pollution and promote economic development, the problem of poverty is still essential for the sustainable development process. Solving them entails using green technologies, addressing population concerns and the population growth rate, and dealing with urbanization (Alam, 2010).

It was further revealed that erosion, desertification, and raveling effects have severe consequences on the socio-economic dimensions, especially in rural Pakistan. According to Abbas et al. (2020), different drivers lead to environmental degradation, such as foreign direct investment, GDP per capita, industrialization, as well as population growth. Soil erosion and land acidity decrease yields of crops, and hence, farmers' income and poverty levels in such provinces will rise. Through irrigation and the use of agrochemicals, issues such as reduced soil productivity, increased soil salinity, and water logging make cultivation difficult (Qiu et al., 2017). Farmer's perceptions show high levels of land degradation, hence leading to factors such as erosion, loss of soil fertility, over-grazing, and poor management practices. Socio-economic effects are maladjustment in agricultural activities, drought, land degradation, higher levels of fertilizer use, and lagging economic development (Ullah et al., 2019). The government management options include providing subsidies to support eco-friendly inputs, training the farmers on better practices, and encouraging the use of advanced technology in agriculture (Qiu et al., 2017).

Pollution in the SAARC countries, particularly Pakistan, India, Afghanistan, and Bangladesh, depends on several factors. Some aspects of urbanization indices are also reported to be declining in Bangladesh, and some are in India, while others are relatively positive or insignificant in Sri Lanka and Pakistan (Azam & Khan, 2015). The analysis results of the impact of factors influencing environmental degradation are as follows: Income inequality and political instability cause negative consequences for the environment, whereas renewable energy use has a positive effect and political stability has a significant positive effect. As cited in Patel et al., 2020, climate change worsens these challenges, with women in informal settlements receiving the raw end. The environmental efficiency of these countries differs according to factors such as air, water, and living organisms (Bhandari, 2012). To overcome these problems, the government should pay much attention to the strategic perspective for the development and sustainability of urban landscapes, elimination of income disparity, shift towards green energy, and political stability (Azam & Khan, 2015; Pata et al., 2022). Also, interventions regarding gender disparities and climatic change susceptibility in slums enhance other aspects of environmental quality in the region (Patel et al. 2020).

Several impediments to the formulation of pragmatic environment policies and management and control of environmental degradation characterize Pakistan. Though the National Climate Change Policy was formulated in 2012, the guidelines for implementing the strategies mainly focused on adaptation and mitigation still need to be fully developed (Hussain et al., 2020). Increased pollution in water sources and the developing industrial areas poses a threat not only to marine life, fish stocks, and public health (Sahibzada & Qutub, 1993). Emissions arising from biomass fuel, a significant danger to health, chiefly for females and youths, do not qualify as environmental pollution in Pakistan despite constituting a significant menace (Fatmi et al., 2010). The country needs more trained human resources in environmental audits and pollution control (Sahibzada & Qutub, 1993). Despite some small-scale interventions aimed at introducing improved stoves and renewable energy, there needs to be more integrated policies, standards, and partnerships for addressing these environmental issues, let alone managing the disease burden (Fatmi et al., 2010).

Therefore, the literature suggests a critically worrying situation regarding Pakistan's deforestation, land degradation, and environmental policy and governance. While remote sensing and GIS offer promising tools for defining the extent of these problems, further research is crucial for developing integrated solutions that consider both the geographical and socio-economic aspects.

Future studies should focus on long-term monitoring, governance in environmental management, and the development of policies that can guide balanced economic growth and environmental preservation.

Methodology:

Search Strategy and Sources

The methodology used for the selection of literature was based on searching for peer-reviewed articles, reports, and gray literature that would help to assess the history of environmental degradation in Pakistan critically. Electronic databases such as Google Scholar, PubMed, Scopus, and Web of Science were used in the literature search. The search was conducted from 1980 to 2024. These were environmental degradation, deforestation, water pollution, soil erosion, climate change, Pakistan, historical analysis, and sustainability. Boolean operators (AND, OR) allowed for narrowing down the search results and checking the topic comprehensively. Additionally, manual searches of reference lists from the studies cited in the identified studies were also done to increase the number of sources. In addition, official documents, policy-related papers, and information from international organizations like the United Nations Environment Program (UNEP) and World Bank have also been incorporated to provide a broad view of the situation.

Inclusion and exclusion criteria

To ensure that the subsequent narrative review remains as relevant and as scientific as possible, certain criteria for inclusion were adopted, as were those for exclusion. Studies were included if they met the following criteria:

1. The focus will be on Pakistan's environmental concerns, with special reference to history, factors, and consequences.
2. Looked at literature accessed between the period of 1980-2024 in order to eliminate publication bias of current research.
3. 3Original articles from reputable scientific magazines or reliable studies from government national horse organizations.
4. We required studies to be published in English or to have an English abstract to ensure clarity and ease of comprehensible reading for our audience.
5. We prioritized studies that used sound research approaches such as remote sensing, Geographic Information System (GIS) policy analysis, or Qualitative case studies, as these methods are particularly effective in environmental science and policy research.

Studies were excluded if they

1. They were not related to Pakistan or were not targeted on the environmental degradation theme.
2. Were they opinion pieces or consisted of studies without empirical evidence?
3. Some details reported in other broader studies were repeated.
4. Were older than the selected time frame unless they presented essential information, without which no analysis of tendencies could be made.

Data extraction and synthesis

A structured format was used to extract data, including the authors, year of publication, objectives of the studies, methods used, results, and any results relevant to environmental degradation in Pakistan. A structured data extraction form was developed to compare all the selected studies. The significance of the thematic analysis, the chosen technique for this review, cannot be overstated. It allowed the identification of new patterns, trends, and contradictions in the literature from previous reviews, thereby adding depth to the research.

The synthesis process was to categorize the studies according to major thematic areas, including deforestation, water pollution, soil erosion, and the effects of industrialization and urbanization. The various studies were compared in terms of the methods used and geographical and temporal frameworks to uncover environmental mental deterioration patterns. However, emphasis was placed on identifying the policy implications and the combined absence of similar studies in the literature; this has led to the development of suggestions for future research. Narrative synthesis was used to achieve an exhaustive and critical understanding of the research question focused on the historical perspectives of environmental degradation in Pakistan.

This review uses several studies with RS & GIS, satellite imagery, and socioeconomic analysis to measure environmental degradation in Pakistan,

including deforestation, land use changes, and socioeconomic effects. The methods employed in the reviewed studies are described in the table below, accentuating their applicability to the study of Pakistan's environmental issues.

Remote Sensing and GIS Analysis of Land Use and Forest Cover

Satellite and GIS data have been very useful in tracking the changing trends in land use and its cover, deforestation, and desertification in regions across the country. These findings have been made possible by applying Landsat satellite data across various research projects in different regions to observe long-term environmental trends. For instance, Aftab et al., while studying the deforestation scenario in Ayubia National Park using GIS coupled with Landsat data of 1992–2022, identified a distinct human-induced deforestation change of 371.94 ha of forest cover. This method was useful in capturing forest cover's dynamic spatial patterns, particularly as a starting point towards forest conservation. Similarly, Raza et al. (2024) employed a land sat-8 image of Balochistan and Sindh (2013–2023). They found that there has been a reduction in vegetation cover by 68.50 km² and an increase in urbanization by 2.23 percent. This research used Principal Component Analysis (PCA) and the Maximum Likelihood Classification (MLC) for land use change analysis, where these areas experience alarming rates of land degradation.

Hira et al. (2024) studied temporal changes in pine forests in Murree using time series data from the Landsat database (2000-2019). The present paper shows an approximate 10 % reduction in the pine forest cover, indicating the need for stringent conservation measures. Furthermore, Goheer et al. (2023) dealt only with the changes in KPK LULC, using the Landsat dataset (1990–2020), carbon stock estimates that pointed toward a 32 percent increase in forest cover by KPK owing to the recent plantation drives. This study found a lack of literature acknowledging the social and economic effects of such change. The audience's work in long-term forest health assessment is crucial in addressing this gap.

Satellite Imagery for Desertification and Land Degradation

Satellite imagery has also been used to determine desertification patterns in Pakistan. Hissan et al. (2024) employed Landsat 8 and 9 satellite data to investigate land degradation in the arid zone. Their use of the Google Earth Engine allowed real-time tracking of land changes, and the study recommended the inclusion of socio-economic factors in the research on desertification.

Socio-Economic Analyses of Environmental Degradation

In line with this, this paper focuses on the socio-economic impacts of environmental degradation, particularly in agriculture and fisheries of local communities. Shahzad (2024) also discussed the role of resource degradation in poverty within the fishing industry of the coast of Pakistan, using ARDL models to assess the economic losses due to poor fishing practices. This study underscores the importance of understanding these socio-economic impacts and the need for enhanced practices to improve the status and capability of those in the low ranks of the employment sector, including women in the fisheries sector.

Furthermore, Muhammad et al. (2024) also investigated the causal nexus between non-renewable energy consumption and environmental degeneration, where they employed ARDL models from 1972 to 2021. They provide evidence that consumption patterns of energy cause pollution and environmental damage and stress the need to adopt green energy.

Similarly, using the ARDL technique, Chishti et al. (2022) analyzed the global environmental effect of energy consumption and quantified the policy loopholes in promoting environment-friendly energy consumption. These two works also establish the underlying social and economic impacts of environmental degradation, such as health complications and problems with yields from farming.

Policy and Governmental Approaches to Environmental Impact

In reviewing EIAs carried out in Pakistan, Khan and Chaudhry (2024, 2021) also documented the following areas for improvement in the methodological approaches: failure of scoping, unsatisfactory engagement of non-technical stakeholders, and absence of alternative assessment. Through these studies, the applicability of EIA legislation was assessed utilizing the Next Generation Framework (NGF); the result revealed

that ambiguity and non-compliance with the legislation have been a challenge to environmental governance.

Theoretical Framework

This review paper highlights that political ecology plays a key role in defining environmental deterioration within developing countries based on the argument that power relations define resource accessibility and environmental consequences (Bryant, 1998). Zaidi (2012) identifies colonial influences and current liberal democratic structures as instrumental in making environmental issues worse in Pakistan, especially for the privileged elite, at the expense of lower, especially local, classes. This framework shows the connection between environmental degradation, political exclusion, and social injustice, exemplified in Gojal, northern Pakistan, where geographical remoteness and conservation measures restrained local resource utilization and agricultural production (Butz & Cook, 2016). As Bryant (1997) claims, by emphasizing the political and economic dimensions of ecological problems, political ecology suggests that prejudices based on social structures are the fundamental cause of environmental problems in Pakistan.

On the same note, sustainability science is another theoretical outlook that affirms the harmonization of development and preservation (Kates et al., 2001). Vulnerable factors and development indices depicting general insight into Pakistan's urbanization and economic advancement indicate that developing sustainable urban centers in such an environment comes with the risk of being slowed down by poverty, poor infrastructure, and climate change (Azhar et al., 2024). The analysis of the Kuznets Curve AV further supports the discussions of the intricate correlation between the economy's growth and the burden of harm. It shows that in terms of industry development, environmental pollution worsens before reaching the critical point of economic maturity and the implementation of new enhanced policies (Kayani et al., 2024). In aggregate, these studies underscore the fact that integrated governance of the environment, selective policies, and sustainable economic development are urgently needed to minimize the impacts of rapid growth of the economy on the environment. This highlights the importance of balancing economic growth with environmental protection, ensuring a sustainable future for Pakistan (Faisal, 2017, Alam, 2010).

Current Challenges and Policy Implications

This evidence indicates that Pakistan needs research-based policymaking and practice transformation to address environmental deterioration. Faruqee (1997) proposes moving from a bureaucratic style to market-oriented environmental policies, stressing economic instruments in environmental regulation. Khan et al. (2021) bring out the ugly face of environmental degradation on growth, suggesting policies that could achieve both energy usage and emission targets. Butt et al. (2021) successfully argue over the subject of embedding environmental measures in development projects such as the China-Pakistan Economic Corridor (CPEC), Pakistan needs to learn a lesson from China on its environmental policy changes. In a more recent work, Rehman and Zeb (2020) addressed the factors causing environmental degradations, they inducted population growth, energy consumption, and Industrialization: Therefore, to curb the impact of energy consumption and Industrialization, the measures of population control and push towards the clean energy should be taken. All things considered, these studies highlight the need for the fortification of environmental laws and the integration of multi-disciplinary cooperation and sustainable development policy with practice to meet the ecological challenges both in the upcoming years and for the longer term in Pakistan.

Therefore, this paper argues that environmental degradation is a major security threat and a barrier to sustainable development in Pakistan. These parameters include urbanization, industrialization, population growth, and environmental problems which are water pollution, air pollution, and deforestation (Sahibzada, 1993; Biswas, 1987). Water pollution from rivers and canals containing industrial waste affects aquatic and related life as well as irrigation and sanitation, and the emissions produced by transportation affect air quality and people's health, (Sahibzada, 1993). Previous research shows that FDI, GDP per capita, and total population affect environmental degradation in a positive manner (Abbas et al., 2020). Profligate use of water in the sector, salinity and water logging in

the water sector, and deforestation particularly fuelwood in the energy sector are other problem areas. Thus, policies for sustainable development, enhancing governance along with environmentally sound strategic assessments are the key (Aslam et al., 2021; Abbas et al., 2020). Also, formal environmental education and intentional enforcement of pollution control laws to restore the environment are prerequisites in Pakistan (Sahibzada, 1993).

Research Gaps and Limitations

Some research gaps have been pointed out in these investigations: First and foremost, further research applying the economic assessment method is required to cover a diverse range of impacts on society and, in particular, the adverse effects of environmental degradation on vulnerable and susceptible population groups. Also lacking is a viable postgraduate research program to assess the state of forests and projected desertification over periods in the future. In Environmental Impact Assessments (EIAs), policy evaluations have noted methodological limitations such as poor exploitation of the Center of Gravity and lack of analysis of the different options for the proposed projects. Last, energy consumption studies and works that quantify environmental decline rarely adequately consider governance or policy issues, which are important to evaluate and manage environmental effects.

Recommendations

1. Enforce Stringent Environmental Legislation: The current environmental governance in Pakistan necessitates a shift from lenient enforcement regimes to more rigorous regulatory provisions. To combat the issues of illegality in deforestation, industrial pollution, and unsustainable exploitation of natural resources, it is imperative to bolster environmental laws with robust enforcement measures. These measures should be sufficiently punitive to ensure compliance from all levels of governments and industries.
2. Prioritize Afforestation Initiatives: Given the escalating deforestation situation, afforestation emerges as the most viable solution for Pakistan. Successful models like the Khyber Pakhtunkhwa reforestation project should be replicated nationwide, supported by a government-led program to incentivize local communities to restore the affected areas. Elevating afforestation measures to a national policy agenda status can yield significant benefits for biological diversity and reduce annual CO_2 emissions.
3. Adopt an Integrated Approach to Environmental Governance: Pollution and related challenges are problems that cannot be solved separately. Pakistan should develop a cross-sectoral and cross-cutting approach to governance involving federal/provincial authorities, industries, communities, and civil society organizations. Policies should make a sustainable environment the central strategy while making economic decisions, especially regarding the development of cities, industries, and general natural resources.
4. Enhance Public Awareness and Environmental Education: The only way to create long-term resilience of the environment, therefore, is through change in society. Great advertising campaigns, as well as environmental education in schools and universities, should be initiated to grow a culture of sustainability within the country's population. Promoting community participation in environmentalism by using energy and water, recycling, and sustainable farming is possible at the grass-roots level.
5. Accelerate the Shift to Renewable Energy: The industrial sector's dependency on fossils is agony. Reducing dependency on conventional resources, especially oil and gas, and introducing new sources like solar, wind, and hydropower investments are much needed for Pakistan in the future. Governmental support towards renewable energy mechanisms and other green initiatives in industrial developments may lower the impacts of their carbon footprints and put Pakistan in an advantageous position for cleaner industrial development.

Conclusion

Pakistan is currently facing urgent environmental challenges due to past mismanagement, haphazard industrialization, and weak policy implementation. This review underscores the pressing need to

address the severity and scope of these issues, particularly the environmental deterioration and the structural problems that persist. With water scarcity increasing, and soil erosion and pollution worsening, Pakistan stands at a critical juncture.

However, the path forward is clear: environmental laws that can be effectively implemented, a strong national policy on afforestation, and integration of environmental policies are required to ward off the thinning out of the environment. The new focus on renewable energy sources and increased public awareness will guarantee that economic development does not harm the environment against the backdrop of BRICS countries. It is true that if Pakistan has to act strongly with proof and initiation, it can manage the impacts of environmental degradation for several years and generate a better potential future for its people and ecosystems. This particular era is critical, which means that decisions made at the current stage will define Pakistan's scholarly tendencies and ecological and economic state of affairs in the upcoming decades.

References

Abbas, S., Kousar, S., Yaseen, M., Mayo, Z. A., Zainab, M., Mahmood, M. J., & Raza, H. (2020). Impact assessment of socioeconomic factors on dimensions of environmental degradation in Pakistan. *SN Applied Sciences*, *2*(3). https://doi.org/10.1007/s42452-020-2231-4
Google Scholar Worldcat Fulltext

Adnan, M., Xiao, B., Bibi, S., Xiao, P., Zhao, P., Wang, H., Ali, M. U., & An, X. (2024). Known and Unknown environmental impacts related to climate changes in Pakistan: An Under-Recognized Risk to Local communities. *Sustainability*, *16*(14), 6108. https://doi.org/10.3390/su16146108
Google Scholar Worldcat Fulltext

Aftab, B., Wang, Z., & Zhongke, F. (2024). Monitoring the Effects of Land Use Land Cover Change on Forest Biomass Carbon" in the Western Himalayan of Pakistan, a Study of Ayubia National Park. https://doi.org/10.20944/preprints202406.1079.v1
Google Scholar Worldcat Fulltext

Ahmed, O., & Mashkoor, A. (2016). Ecological warfare against Pakistan from India: Water war results in devastated ecological issues in Pakistan.
Google Scholar Worldcat Fulltext

Alam, S. (2010). Globalization, poverty and environmental degradation: Sustainable Development in Pakistan. *Journal of Sustainable Development*, *3*(3). https://doi.org/10.5539/jsd.v3n3p103
Google Scholar Worldcat Fulltext

Amalric, F., & Banuri, T. (Eds.). (1995). *People, the environment and responsibility: Case studies from rural Pakistan*. CRC Press.
Google Scholar Worldcat Fulltext

Aslam, B., Gul, S., & Asghar, M. F. (2021). Evaluation of environmental degradation as an unprecedented threat to human security in Pakistan. *Liberal Arts and Social Sciences International Journal (LASSIJ)*, *5*(1), 197–211. https://doi.org/10.47264/idea.lassij/5.1.14
Google Scholar Worldcat Fulltext

Azam, M., & Khan, A. Q. (2015). Urbanization and environmental degradation: Evidence from four SAARC Countries—Bangladesh, India, Pakistan, and Sri Lanka. *Environmental Progress & Sustainable Energy*, *35*(3), 823–832. https://doi.org/10.1002/ep.12282
Google Scholar Worldcat Fulltext

Azhar, N., Khan, R. A., & Arif, F. (2024). Challenges to sustainable city development for Karachi, Pakistan. *Construction Technologies and Architecture, 13*, 189-196.
Google Scholar Worldcat Fulltext

Bhandari, M. P. (2012). Environmental performance and vulnerability to climate change: a case study of India, Nepal, Bangladesh and Pakistan. In *Climate change management* (pp. 149–167). https://doi.org/10.1007/978-3-642-31110-9_10
Google Scholar Worldcat Fulltext

Biswas, A. K. (1987). Environmental Concerns in Pakistan, with Special Reference to Water and Forests. *Environmental Conservation*, *14*(4), 319–328. https://doi.org/10.1017/s0376892900016830
Google Scholar Worldcat Fulltext

Bryant, R. L. (1997). Beyond the impasse: the power of political ecology in Third World environmental research. *Area*, *29*(1), 5–19. https://doi.org/10.1111/j.1475-4762.1997.tb00003.x
Google Scholar Worldcat Fulltext

Bryant, R. L. (1998). Power, knowledge and political ecology in the third world: a review. *Progress in Physical Geography Earth and Environment*, *22*(1), 79–94. https://doi.org/10.1177/030913339802200104
Google Scholar Worldcat Fulltext

Butt, M. J. (2021). A Comparative Analysis of the Environmental Policies in China and Pakistan: Developing a Legal Regime for Sustainable China-Pakistan Economic Corridor (CPEC) under the Belt and Road Initiative (BRI). *SSRN Electronic Journal*. https://doi.org/10.2139/ssrn.3928027
Google Scholar Worldcat Fulltext

Butz, D., & Cook, N. (2016). Political ecology of Human-Environment change in Gojal, Gilgit-Baltistan, Pakistan. In *Advances in Asian human-environmental research* (pp. 197–214). https://doi.org/10.1007/978-3-319-23198-3_13
Google Scholar Worldcat Fulltext

Chishti, S. Z., Ali, M. H., Khan, M., & Hassan, M. S. U. (2022). The influence of economic growth and energy consumption on environmental degradation in Pakistan. *iRASD Journal of Energy & Environment*, *3*(1), 30–37. https://doi.org/10.52131/jee.2022.0301.0023
Google Scholar Worldcat Fulltext

Faisal, F. (2017). SUSTAINABILITY: AN IMPERATIVE FOR IMPROVING GOVERNANCE AND MANAGEMENT IN PAKISTAN. *Pakistan Economic and Social Review*, *55*(1), 81–106. https://www.jstor.org/stable/26730214
Google Scholar Worldcat Fulltext

Faruqee, R. (1997). *Using economic policy to improve environmental protection in Pakistan* (No. 1757). World Bank Publications. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/775311468761124529/Using-economic-policy-to-improve-environmental-protection-in-Pakistan
Google Scholar Worldcat Fulltext

Fatmi, Z., Rahman, A., Kazi, A., Kadir, M. M., & Sathiakumar, N. (2010). Situational analysis of household energy and biomass use and associated health burden of indoor air pollution and mitigation efforts in Pakistan. *International Journal of Environmental Research and Public Health*, *7*(7), 2940–2952. https://doi.org/10.3390/ijerph7072940
Google Scholar Worldcat Fulltext

Goheer, M. A., Fatima, L., Farah, H., Hassan, S. S., & Abbas, N. (2023). Assessment of change in forests land, carbon stock and carbon emissions of KPK, Pakistan for past three decades using geospatial techniques. *Journal of Water and Climate Change*, *14*(2), 442–453. https://doi.org/10.2166/wcc.2023.315
Google Scholar Worldcat Fulltext

Hasan, A., & Ali, A. A. (1992). Environmental problems in Pakistan; their origins and development and the threats that they pose to sustainable development. *Environment and Urbanization*, *4*(1), 8–21. https://doi.org/10.1177/095624789200400103
Google Scholar Worldcat Fulltext

Hira, N. E., Siddiqui, M. T., Abd-Elrahman, A., & Javed, M. A. (2024). Spatio-temporal monitoring of forest cover change, triggered by anthropogenic activities, in the Himalayan moist temperate forests of Pakistan using Landsat imagery. *Journal of Spatial Science*, 1–18. https://doi.org/10.1080/14498596.2024.2333754
Google Scholar Worldcat Fulltext

Hissan, R. U., Shafiq, H., Nassani, A. A., Parveen, N., Hussain, B., & Radulescu, M. (2024). Assessment of spatio-temporal dynamics of land degradation and desertification in Pakistan and its impact on agriculture productivity. *Environment Development and Sustainability*. https://doi.org/10.1007/s10668-024-05224-x
Google Scholar Worldcat Fulltext

Hussain, D. S., Raja, I. R., & Mehsud, M. I. (2020). Challenges to the implementation of national climate change policy of Pakistan. *Semantics Scholar*. https://www.semanticscholar.org/paper/Challenges-to-the-Implementation-of-National-Change-Hussain-Raja/126cf8def5dea8d55ed88fada187ba7b84a1da24
Google Scholar Worldcat Fulltext

Kates, R. W., Clark, W. C., Corell, R., Hall, J. M., Jaeger, C. C., Lowe, I., McCarthy, J. J., Schellnhuber, H. J., Bolin, B., Dickson, N. M., Faucheux, S., Gallopin, G. C., Grübler, A., Huntley, B., Jäger, J., Jodha, N. S., Kasperson, R. E., Mabogunje, A., Matson, P., . . . Svedin, U. (2001). Sustainability science. *Science*, *292*(5517), 641–642. https://doi.org/10.1126/science.1059386
Google Scholar Worldcat Fulltext

Kayani, U. N., Mumtaz, R., Fahlevi, M., Nasseseredine, H., & Hadinata, A. (2024). Unbridling the economic growth and environmental nexus in Pakistan. *International Journal of Energy Economics and Policy*, *14*(1), 488–495. https://doi.org/10.32479/ijeep.15528
Google Scholar Worldcat Fulltext

Khan, A. A., Mustaqeem, U., Jamal, F., Kamzi, S. M. A., Shafiq, S., & Shah, S. I. (2021). Impact of environmental degradation and energy consumption on growth: An Empirical analysis. *International Journal of Business and Economic Affairs*, *6*(5). https://doi.org/10.24088/ijbea-2021-65002
Google Scholar Worldcat Fulltext

Khan, M., & Chaudhry, M. N. (2021). Role of and challenges to environmental impact assessment proponents in Pakistan. *Environmental Impact Assessment Review*, *90*, 106606. https://doi.org/10.1016/j.eiar.2021.106606
Google Scholar Worldcat Fulltext

Khan, M., & Chaudhry, M. N. (2024). Evaluation of Environmental Impact Assessment legislation in Pakistan. *Impact Assessment and Project Appraisal*, *42*(2), 123–140. https://doi.org/10.1080/14615517.2024.2320590
Google Scholar Worldcat Fulltext

Lin, B., & Ullah, S. (2024). Evaluating forest depletion and structural change effects on environmental sustainability in Pakistan: Through the lens of the load capacity factor. *Journal of Environmental Management*, *353*, 120174. https://doi.org/10.1016/j.jenvman.2024.120174
Google Scholar Worldcat Fulltext

Muhammad, F., Qayyum, A., Bawazir, A. A., Jan, M., & Ahmed, N. (2024). Assessing the Tri-Dimensional Nexus of Energy, environment, and Economic Growth in Pakistan: an Empirical study. *International Journal of Energy Economics and*

Policy, *14*(4), 329–343. https://doi.org/10.32479/ijeep.16128
Google Scholar Worldcat Fulltext

Patel, A., Lotia, H., Malik, A. A., Mundt, M. D., Lee, H., & Rafiq, M. A. (2020). Gendered Impacts of Environmental Degradation in Informal settlements: A Comparative analysis and policy implications for India, Bangladesh, and Pakistan. *Journal of Comparative Policy Analysis Research and Practice*, *23*(4), 468–484. https://doi.org/10.1080/13876988.2020.1829454
Google Scholar Worldcat Fulltext

Qiu, L. L., Koondhar, M. A., Liu, Y. Y., & Zeng, W. Z. (2017). Land Degradation is The Instinctive Source of Poverty in Rural Areas of Pakistan. *IOP Conference Series Earth and Environmental Science*, *86*, 012003. https://doi.org/10.1088/1755-1315/86/1/012003
Google Scholar Worldcat Fulltext

Raza, A., Syed, N. R., Fahmeed, R., Acharki, S., Aljohani, T. H., Hussain, S., Zubair, M., Zahra, S. M., Islam, A. R. M. T., Almohamad, H., & Abdo, H. G. (2024). Investigation of changes in land use/land cover using principal component analysis and supervised classification from operational land imager satellite data: a case study of under developed regions, Pakistan. *Discover Sustainability*, *5*(1). https://doi.org/10.1007/s43621-024-00263-w
Google Scholar Worldcat Fulltext

Sahibzada, S. A., & Qutub, S. A. (1993). Urbanisation and environmental degradation in Pakistan [with comments]. *The Pakistan Development Review,* *32*(4), 639-649.
Google Scholar Worldcat Fulltext

Saif, S., Mehmood, A., Chaudhry, M. N., & Akhtar, S. (2015). Evaluating the adequacy and quality of Environment Impact Assessment (EIA) reports in Punjab, Pakistan. *Journal of Environmental Assessment Policy and Management*, *17*(03), 1550030. https://doi.org/10.1142/s1464333215500301
Google Scholar Worldcat Fulltext

Shahzad, N. S. M. (2024). ECONOMIC IMPLICATIONS OF DECLINING FISHERIES IN PAKISTAN. *Pakistan Journal of Science*, *76*(01), 1–6. https://doi.org/10.57041/pjs.v76i01.1082
Google Scholar Worldcat Fulltext

Sohail, M. T., Delin, H., Talib, M. A., Xiaoqing, X., & Akhtar, M. M. (2014). An analysis of Environmental law in Pakistan-policy and conditions of implementation. *Research Journal of Applied Sciences Engineering and Technology*, *8*(5), 644–653. https://doi.org/10.19026/rjaset.8.1017
Google Scholar Worldcat Fulltext

Tabassum, I. (2012). Degradation of communal natural resources and their impacts on mountain women: A case study of Karak District, Pakistan. *Pakistan Journal of Social Sciences (PJSS),* *32*(1).
Google Scholar Worldcat Fulltext

Ullah, S., Israr, M., Ahmad, S., Ahmad, N., & Yaseen, A. (2019). Farming household Socio-Economic influences on land degradation in District Mardan of Pakistan. *Sarhad Journal of Agriculture*, *35*(2). https://doi.org/10.17582/journal.sja/2019/35.2.449.458
Google Scholar Worldcat Fulltext

ur Rehman, H., & Zeb, S. (2020). Determinants of environmental degradation in the economy of Pakistan. *Empirical Economic Review,* *3*(1), 85-109. http://dx.doi.org/10.29145/eer/31
Google Scholar Worldcat Fulltext

Warner, E. (2023). *Pakistan's contribution to the global rise in conventional pollution* (CMC Senior Theses, No. 3388). Claremont McKenna College. https://scholarship.claremont.edu/cmc_theses/3388?utm_source=scholarship.claremont.edu%2Fcmc_theses%2F3388&utm_medium=PDF&utm_campaign=PDFCoverPages
Google Scholar Worldcat Fulltext

Yasin, A., Shahzad, L., Hayyat, M. U., Ghafoor, G. Z., Saeed, S., Sharif, F., ... & Saleem, M. B. (2023). Assessing and Mapping the Impact of Tourism and Changing Climatic Conditions in Himalayan Region of Pakistan. *Journal of Environmental Management & Tourism*, *14*(3), 605-622.
Google Scholar Worldcat Fulltext

Zaidi, R. Z. (2012). Entering the field: Examining the relevance of political ecology to the agrarian struggle of Anjuman Muzareen Punjab in Pakistan. *Singapore Journal of Tropical Geography*, *33*(1), 63–76. https://doi.org/10.1111/j.1467-9493.2012.00454.x
Google Scholar Worldcat Fulltext